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An Engineer Cantonment Bestiary: The Art of Titian Ramsay Peale

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11.2 An Engineer Cantonment Bestiary: The Art of Titian Ramsay Peale

Hugh H. Genoways and Thomas E. Labedz

Introduction

The first modern biographer of Titian Ramsay Peale, Jessie Poesch (1961), evaluated Peale's life as: "Not a giant of his time, his life and his work nonetheless have a compelling interest. Perhaps his very failures make him worthy of study. He experienced both the joy and satisfaction of achievement as well as the bitterness of defeat . . . ." There are several reasons for this "damning with faint praise." Kenneth Haltman (2008), a more recent biographer and art historian wrote: "For one thing, by mid-century [nineteenth] most of the hundreds of drawings and paintings from the expedition had been lost to view." In the 30 interceding years (1820 to 1850), Peale had stopped working on the Long Expedition images and was pursuing other projects and work. He had left his father's Peale or Philadelphia Museum where the images and specimens from the Long Expedition had been deposited along with the material resulting from the Lewis and Clark Expedition. By the middle of the century, material in the Philadelphia Museum was dispersed by sale or destroyed by fire. Dolores Gall (1983) wrote that: "his work is relatively unknown except to a few biologists and collectors of natural history illustration."

Beginning in the mid-1950s many of Peale's images have come into institutional holdings, particularly the American Philosophical Society, American Museum of Natural History, and Library of Congress where they have been made freely available to researchers and for exhibitions (American Philosophical Society 2001; Gall 1983; Haltman 1992, 2008; Murphy 1957; Porter 1985). This has allowed a rediscovery and re-evaluation of Peale's

works by art historians (Gall 1983; Haltman 1992, 2008; Novak 2007; Nygren 1986), historians of science (Porter 1983a, 1983b, 1985), and scientists (Genoways and Ratcliffe 2008; Woodman 2009). Art historian Barbara Novak (2007) listed Peale among the artist-scientists that reached "'heroic' status" because of the risks and hardships that he and others undertook in the exploration of the American continent. Haltman (2008) credited Peale and his fellow artist on the Long Expedition, Samuel Seymour, with innovating "such hybrid pictorial forms as wilderness landscape . . , natural history illustration featuring specimens in representative environments . . , ethnographic portraiture . . , and genre painting . . . ."

Art historian Amy Meyers (1986) placed Peale's landscapes within the convention of the picturesque, which was popular in Britain and America during this time period. In the picturesque convention the artist takes the unfamiliar and renders it to be comprehensible and accessible so that it encourages the entry of the spectator. As Meyers (1986) observed:

> By blending the full-fledged landscape with the specimen drawing Peale defines the organism more specifically . . . . The emphasis on place in Peale's studies from the Long expedition reveals an interest not only in classification of species but in their geographical distribution.

In fact, from a scientific viewpoint, Peale's images present information on the identifying characteristics of the organism, its geographic distribution, and its ecology. Gall (1983) believed that Peale "should be counted as one of America's early lithographers and the first to use the new technique for a zoological publication." Some of Peale's early animal lithographs were based on work from the Long Expedition.

Another impact of Peale's and Seymour's work that has not been widely recognized is their influence on other early American artists, including Thomas Cole, Thomas Doughty, Peter S. Duval, and James Otto Lewis. Peale's influence is probably most noticeable among the other, more-widely known artist-naturalists—John James Audubon, Karl Bodmer, and George Catlin. Each of these men had passed through Philadelphia and visited the Peale Museum examining specimens, sketches, and completed paintings resulting from the Long Expedition, prior to their own passages into the west and the territory of the Louisiana Purchase (Haltman 2008). Charlotte Porter, a historian of science noted (1985): "These similarities need not be considered coincidental, for before he went west, [Alfred Jacob] Miller, like George Catlin and Karl Bodmer, visited Peale's museum." Porter (1985) continued to comment: "Peale's drawing abilities, however, were outstanding, and his studies of mammals collected on the Long Expedition from 1819 to 1820 comprise a large group of illustrations of high quality." Indeed, it is our opinion that the quality of Peale's images of mammals from the Long Expedition are superior to those of any of the other artist-naturalists mentioned here. His images have scientific accuracy as well as an artistic appeal.

Neal Woodman (2009), Curator of Mammals for the Fish and Wildlife Service, makes a case for the scientific value of Peale's images because: "Illustrations of holotypes are taxonomically useful when they depict diagnostic characters of species. They take on added taxonomic significance in the absence of the holotypes. In the cases of *Sorex brevicaudus* (northern short-tailed shrew) and *Sorex parvus* (least shrew), pictures provide strong confirmation of the taxonomic identities of these two species, as well as recording the early history of the specimens." The term holotype is used by scientists for the one individual specimen designated to 'represent' a new species. It is in comparison to this standard that all future identifications are made.

In the bestiary at the end of this section there are watercolors of four holotypes, including the two shrew species mentioned by Woodman and the coyote and buffalo wolf. In this bestiary, we have assembled a selection of animal illustrations that were created while the Long Expedition was in winter quarters at Engineer Cantonment. Many of these images have not been published previously or not published in color previously. This is unfortunate, because it has denied us the opportunity to see the breadth of Peale's color palette and how well he used this palette to represent the colors of his subjects. These works by Titian Ramsay Peale include completed watercolors, works in ink and pencil, field sketches, and detailed studies for later development into completed works. Animals represented in the gallery are one of the few fish drawn by Peale, eight birds, and 16 mammals. There is also a landscape drawing showing Engineer Cantonment and its environs (fig. 11.2.1), as well as another similar illustration presented in Chapter 1 (plate 1.2.1 A). These landscapes, as well as drawings with backgrounds come to us as nearly 200-year-old 'photographs' of the appearance of eastern Nebraska. These are probably the oldest images available for this region and it is fortunate that a person with both a scientific and an artistic eye created them.

Titian Ramsay Peale (II)

Titian Ramsay Peale was born in Philosophical Hall in Philadelphia on November 2, 1799. He was the youngest son of Charles Willson Peale, the famed portrait painter, patriot, and museum builder (American Philosophical Society 2001; Murphy 1957; Poesch 1961; Porter 1985). He was named for an older half-brother who

had died the previous year of yellow fever. His formal education ended at the secondary level, but he did attend some lectures on anatomy at University of Pennsylvania (Murphy 1957). Philadelphia was the intellectual center of the United States, and the development of American natural history at that time in many ways centered on Peale's museum. The leaders of science either lived and worked in Philadelphia or passed through the city, many of them stopping and spending time at the museum (Murphy 1957; Porter 1985). Titian would have been exposed to these people because he began working in the museum around 1814.

In 1817 he provided the six colored plates for the prospectus of Thomas Say's *American Entomology*. This first significant scientific contribution led to his election to the Academy of Natural Sciences of Philadelphia. Late that year he participated in a scientific expedition to Georgia and Florida with the scientists George Ord and Thomas Say, and he returned to Florida in 1825. The Long Expedition of 1819–1820 took Peale into the part of the Louisiana Purchase that forms the modern states of Missouri, Iowa, Kansas, Nebraska, Colorado, Oklahoma, and Arkansas. "Peale made 122 sketches during the trip which were also deposited in the Philadelphia Museum by Major Long. Many of them were afterwards elaborated and used in the illustration of the scientific papers . . ." (Peale 1901). Following the Long Expedition, Peale returned to work at the Philadelphia Museum and continued to prepare illustrations for scientific monographs. He prepared several drawings for Charles Bonaparte's supplement to *American Ornithology* and 54 colored plates for Say's three volumes *American Entomology*. In the fall of 1830 he returned to the field along the Magdalena River, Colombia, where he worked until the spring 1832. This work and his scientific illustrations allowed him to be elected to the American Philosophical Society in 1833 (American Philosophical Society 2001; Murphy 1957; Poesch 1961; Porter 1985).

Peale's major professional opportunity came when he was named naturalist for Charles Wilkes' United States Exploring Expedition, which was a four-year (1838–1842) naval exploration and surveying expedition to the Pacific Ocean. This first major international expedition by the United States visited such places as Fiji, Hawaii, the northwest Pacific Coast, California, and the Philippines before circumnavigating the globe. Wilkes and Peale had a falling out upon their return home, with Peale going back to work at the Philadelphia Museum. Peale completed a publication on the *Mammalia and Ornithology* of the expedition, but it was suppressed by Wilkes and replaced by the work of John Cassin in 1858 (American Philosophical Society 2001; Murphy 1957; Poesch 1961; Porter 1985).

With these setbacks and failure of the Philadelphia Museum in 1845, Titian Peale was forced to seek more permanent employment. He took a position as an assistant examiner in the U.S. Patent Office in 1848 where he remained until 1873, living in the Washington, D.C. area throughout this period. Upon his retirement, Peale returned to Philadelphia where he took up his painting again and cultivated an interest in photography. His work focused on producing an illustrated work on American butterflies, but it was never completed. He died in Philadelphia in 1885 (American Philosophical Society 2001; Murphy 1957; Poesch 1961; Porter 1985). Charlotte Porter (1985) observed: "By the time of his retirement to Philadelphia in 1873, the images of the American west he had created at the age of nineteen had passed from natural history into the world of art."

Long Expedition, 1819–1820

Some of the criticism of Peale and his work on the Long Expedition probably results from broader problems with the entire expedition. Initially this was to be the Yellowstone Expedition, with the explorers pushing up the Missouri River to the mouth of the Yellowstone River in present-day North Dakota. However, an economic crisis in the nation and trouble with the steamboats cut their destination short. The expedition was composed of two parts with Major Stephen H. Long heading the scientific and topographic portion and Colonel Henry Atkinson being responsible for the military portion. The Long Expedition began in Pittsburgh in May 1819, went to St. Louis, and then, taking the Missouri River, arrived just north of Omaha on September 19, 1819. Here the expedition established their winter quarters calling it Engineer Cantonment at a place in Washington County, Nebraska, 5 km south and 6.5 km east of the present-day town of Fort Calhoun. They built two log cabins with limestone fireplaces mined from the nearby quarry and stored their steamboat, ***Western Engineer***, and four keelboats in an oxbow near the cabins. The military contingent also arrived in the fall of 1819 and established a camp along the river near the Council Bluff of Lewis and Clark. The following summer they established Fort Atkinson on the site of Council Bluff, 1.5 km east of Fort Calhoun. The scientific party and their small military escort remained at Engineer Cantonment while Major Long went east over the winter to try to gather support for completing the expedition. The scientists were busy all winter gathering information on the topography, fauna, flora, and native people in the vicinity of Engineer Cantonment.

Much of the criticism of the expedition relates to the abbreviated summer trip in 1820. The expedition was charged with: following the Platte River; then, the South Platte River to its source; next to follow the Rocky Mountain front range southward to find the headwaters of the Arkansas River and Red River; finally, to follow them east to Fort Smith, Arkansas. With Major Long's return in the spring of 1820, the expedition moved west following the Platte River on June 6. They were short of everything

including food, guns, ammunition, and horses. In addition, they lacked wagons and relied on the meager supply of horses and mules to carry gear, supplies, and scientific materials. The party went for significant periods of time without finding game to supplement their short rations. All of this contributed pressure to move quickly to complete the mission. This left little time for the scientists to collect and preserve specimens or for the artists to make more than quick sketches (James 1822, 1823; Nichols 1971a; Poesch 1961). It was clear that "distance and speed became more important than quality or thoroughness of investigation" (Nichols and Halley 1980).

The party located the place where the South Platte River exited the mountains, but as they began to follow it, the terrain became rugged and travel was slow, so the effort was abandoned. They did, however, find Pike's Peak, and three members of the party ascended the mountain, making the first alpine collections from the Rocky Mountains. They moved farther south, finding the Arkansas River, but encountered the same problem trying to find its source. The party split with some members passing east and the others proceeding to search for the Red River, which they erroneously believed they had found but actually had followed the Canadian River eastward. The parties rejoined at Fort Smith, Arkansas, on September 9, 1820 (James 1822, 1823; Nichols 1971a; Poesch 1961).

Critics have noted that the primary objectives for the 1820 travel to find and explore the headwaters of the South Platte, Arkansas, and Red rivers were not accomplished and that the Red River was never found. On the trip eastward three soldiers had deserted, taking several of Say's notebooks and specimens, which were never recovered. The expedition also has been criticized for forwarding the idea of the "Great American Desert" (Dillon 1967) covering much of area that is now considered the Great Plains.

However, recently there have been more positive views taken of the results of the Long Expedition (Allen 1975). Roger Nichols (1971a) has posited the presence of the scientists "as members of Long's 1820 expedition represented the first conscious effort by the federal government to employ a significant number of trained men for overland exploration beyond the Missouri River." This became the pattern for the government sponsored topographic and geographic surveys of the American West throughout the remainder of the nineteenth century. Genoways and Ratcliffe (2008) contend that Thomas Say, Titian Peale, Edwin James, and their colleagues on the Stephen Long Expedition completed the first biodiversity inventory undertaken in the United States in the vicinity of Engineer Cantonment between September 19, 1819, and June 6, 1820. At least 300 species of mammals, birds, reptiles, amphibians, fish, insects, snails, and plants were documented in this area. This vital survey has been overlooked both by biologists and historians, but it should rank among the most significant accomplishments of the expedition:

> The results of this inventory continue to inform us today about environmental, faunal, and floral changes along the Missouri River in an area that is known to be an ecotone between the deciduous forests of the eastern United States and the prairies of the Great Plains. This inventory was completed at a time when the impact of Euro-Americans was just beginning. The written documents, collections, and drawings left to us form an image of a dynamic riverine system in which a highly meandering river flows through a wide valley filled with oxbows, palustrine wetlands, and scattered groves of trees (Genoways and Ratcliffe 2008).

Engineer Cantonment

Stephen Long carefully chose the site of Engineer Cantonment within a kilometer or so of Manuel Lisa's trading post, with a limestone quarry between them. He obviously selected the site with the eye of an experienced explorer and engineer to take advantage of all of the local resources:

> [A] very narrow plain or beach, closely covered with trees, intervenes between the immediate bank of the river, and the bluffs, which rise near two hundred feet, but are so gradually sloped as to be ascended without great difficulty, and are also covered with trees . . . . Here were abundant supplies of wood and stone, immediately on the spot where we wished to erect our cabins, and the situation was sheltered by the high bluffs from the northwest winds. The place was called Engineer Cantonment (James 1822:I:153).

Titian Peale left us at least two excellent watercolors (plate 1.2.1 A; fig. 11.2.1) giving a view of Engineer Cantonment, which provides a visual record of the site in 1820. In the watercolors, we can see the cabins near the water's edge with a few trees around them. To the north (right) along the plain there appears to be a dense growth of trees. The ridge behind the camp

Fig. 11.2.1. Engineer Cantonment with deer. Courtesy of the State History Museum of Iowa, Des Moines.

appears to have trees as well, but they do not appear to be as dense a growth as along the plain. In the foreground of the painting in Chapter 1 (plate 1.2.1 A) the *Western Engineer* and four keelboats are anchored in an area believed to be an oxbow off the Missouri River. Peale dated this watercolor as February 1820 and the trees are without leaves so this probably represents the correct date. The painting in the current chapter (fig. 11.2.1) is made from a similar perspective, but a buck white-tailed deer (common and scientific names for animals from Engineer Cantonment may be found in Appendix E) has replaced the *Western Engineer* in the foreground, with the steamboat and keelboats more toward the background. However, in this latter watercolor the trees have leaves and the buck's antlers appear to be fully formed, so the scene represents another time of year.

Leaving Engineer Cantonment on June 6, 1820, and riding to the west, Captain Bell made the following observations:

> After ascending the hill distant from the Missouri half a mile we enter the prairie which is undulating and entirely destitute of timber. From the hills of the prairie we had a beautiful view of Council Bluff and the country on the opposite side of the river-variegated with wood and meadow land (Bell 1957:105).

Fauna at the Edge of the Plains

"Among the collections made on this expedition were 60 prepared skins of animals then new to science or rare, several thousand insects mostly new, 500 species of plants . . . and a large collection of shells and many minerals" (Peale 1901:321).

From the description of the area surrounding Engineer Cantonment, it is evident that it is an ecotone, a transitional zone, between two major ecosystems—eastern deciduous forest and the grasslands of the Great Plains. The species of mammals documented by the Long Expedition demonstrate this zone of transition with species typical of the oak-hickory deciduous forests of the eastern United States being present, such as opossum, gray squirrel, eastern chipmunk, least shrew, northern short-tailed shrew, and white-footed mouse. At the same time, the field party recorded species typical of the grasslands of the Great Plains, such as the bison, buffalo wolf, coyote, pronghorn, and American badger. Species that were typical inhabitants of forest edge habitats, such as fox squirrel, woodchuck, and white-tailed deer, were also well represented. Most species of mammals with aquatic or semi-aquatic habitat requirements, such as the American beaver, muskrat, meadow jumping mouse, mink, and otter, were recorded by the expedition.

It is informative to look at the changes of species composition over the past 200 years in the area of Engineer Cantonment. Mammals of large to medium-size are the

most likely to now be missing. Three large grass-eating mammals are now gone—elk (confined primarily to western Nebraska), pronghorn (now confined to western Nebraska), and bison (extinct in the wild)—leaving the white-tailed deer as the largest herbivore. A similar number of large carnivores have been removed from eastern Nebraska—buffalo wolf (subspecies is extinct), black bear (no resident populations in Nebraska), and river otter (extirpated from state but now reintroduced)—leaving the coyote as the top predator in the area. The loss of these top herbivores and carnivores presents a major challenge to conservationists who are attempting to restore natural areas along the Missouri River visited by the Long Expedition. However, it is only with data like those provided from the Long Expedition that we can understand and set conservation goals.

An Engineer Cantonment Bestiary

The first view of Engineer Cantonment appears in Chapter 1 (plate 1.2.1 A). In that view, the expedition's winter cabins can be seen near the water's edge with a few trees around them. In the foreground of the painting, the *Western Engineer* and at least four keelboats are anchored in an area believed to be an oxbow off the Missouri River. Engineer Cantonment served as the winter quarters for the Stephen H. Long Expedition from September 19, 1819 to June 6, 1820.

The second viewpoint (fig. 11.2.1, above) is similar to that of the first watercolor in Chapter 1, but here, a buck white-tailed deer is in the foreground, and the *Western Engineer* and keelboats are nearer to the cabins. In this image, the trees appear to have leaves as opposed to the previous watercolor. The antlers of the deer appear to be fully formed, which should occur about mid-September, with the antlers being lost no later than the end of January. The antlers begin regrowing in May–June. The only time of year that the trees would be leafed out and the deer would have mature antlers would be mid-September to early October. This would be early in the residence at Engineer Cantonment. This really does not look like an autumn scene, but rather it appears to be springtime. The scene is probably a composite with elements brought together from multiple times of year but based on the original February 1820 winter sketch. White-tailed deer were abundant in the environs of Engineer Cantonment and venison was a major component of the diet of the military contingent, the scientific party, and to a lesser extent the soldiers once they were established at Fort Atkinson (see Falk et al., this volume, Section 9.3, table 9.3.13).

Banded Killifish

Fig. 11.2.2 is an illustration of the banded killifish (*Fundulus diaphanous*) recognized by the black vertical bars along its side. It is a small fish, being 10 to 13 cm (3 to 4 inches) in total length. The species is widely distributed in eastern North America where it is most often found in shallow and quiet areas of clear lakes, ponds, and rivers, with sandy gravel or muddy bottoms. It feeds on small aquatic insects and crustaceans. Noted on the drawing is "Eng Cant, Feb 1820," which relates to the entry in the expedition journal: "12th. [Feb] Messrs. Dougherty, Peale, and myself, with an assistant, encamped at a pond near the Boyer to obtain fish; we cut several holes in the ice of the pond, and obtained one Otter and a number of small fishes

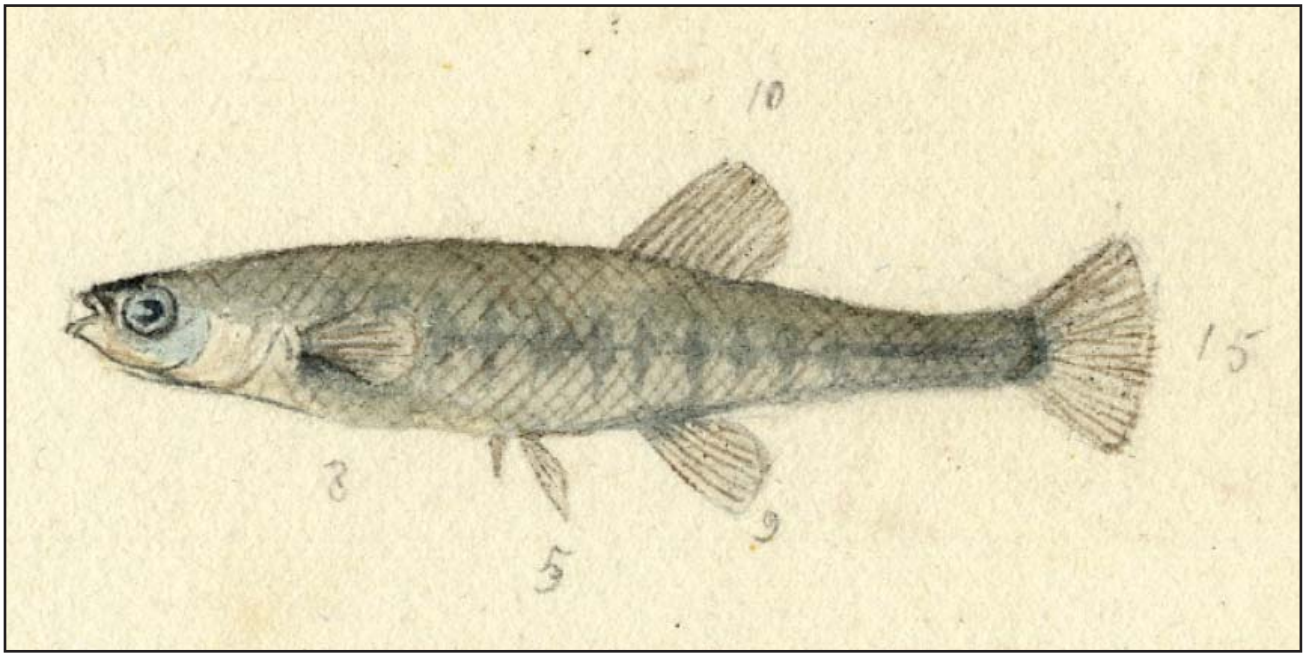


Fig. 11.2.2. Banded killifish. Courtesy of the American Philosophical Society, APSimg5645.

. . .” The mouth of Boyer River was on the eastern side of the Missouri River across from Engineer Cantonment. Although this small fish is known in rivers in western Iowa, it has not been reported from streams in Nebraska. Another similar fish, the plains killifish (*F. zebrinus*) occurs in the Platte River drainage of Nebraska (Jones 1963:22; Morris et al. 1972:75).

American White Pelican

Fig. 11.2.3 is a pencil sketch by Peale is of three American White Pelicans (*Pelecanus erythrorhynchos*) providing a study of the posture of the birds while feeding. These large aquatic birds have a wingspan up to 2.4 m (9 ft). Males and females carry similar plumage, which is white except for the black-tipped and black-edged wings. Their large bills with expandable pouches are orange, as are their legs and webbed feet. The nuptial tubercle seen on the top of the bills of Peale’s pelicans is a fibrous plate that drops off when the mating season is completed. American White Pelicans are regular spring and fall migrants through Nebraska, although non-breeding birds will spend the summer in the Sandhills and large reservoirs. Breeding occurs to the north of Nebraska, primarily in Canada. The expedition journal noted that they “. . . arrived April 8, 1820” at Engineer Cantonment. American White Pelicans do not dive from the air into the water to capture their prey like their coastal relative the Brown Pelican (*Pelecanus occidentalis*), but rather they float on the surface and lower their heads into the water, catching the prey in the pouch portion of their bills. Many times the pelicans form hunting groups that swim in circles (as in Peale’s sketch) or toward the shore to herd the prey species together. Diet of the pelican includes primarily fish, but they also will eat salamanders, crayfish, and other aquatic organisms. The note in the lower left corner is “Engineer Cant., Apr 1820.”

Wood Duck

Fig. 11.2.4 is a watercolor in which Peale presents the head of a male Wood Duck (*Aix sponsa*). Peale gives us a life-like rendering of this beautiful duck with a boldly marked head including white stripes and a pattern of green and purplish extending into its crest. Wood Ducks are common spring and fall migrants in Nebraska and nest in the state primarily among the riparian forests along the

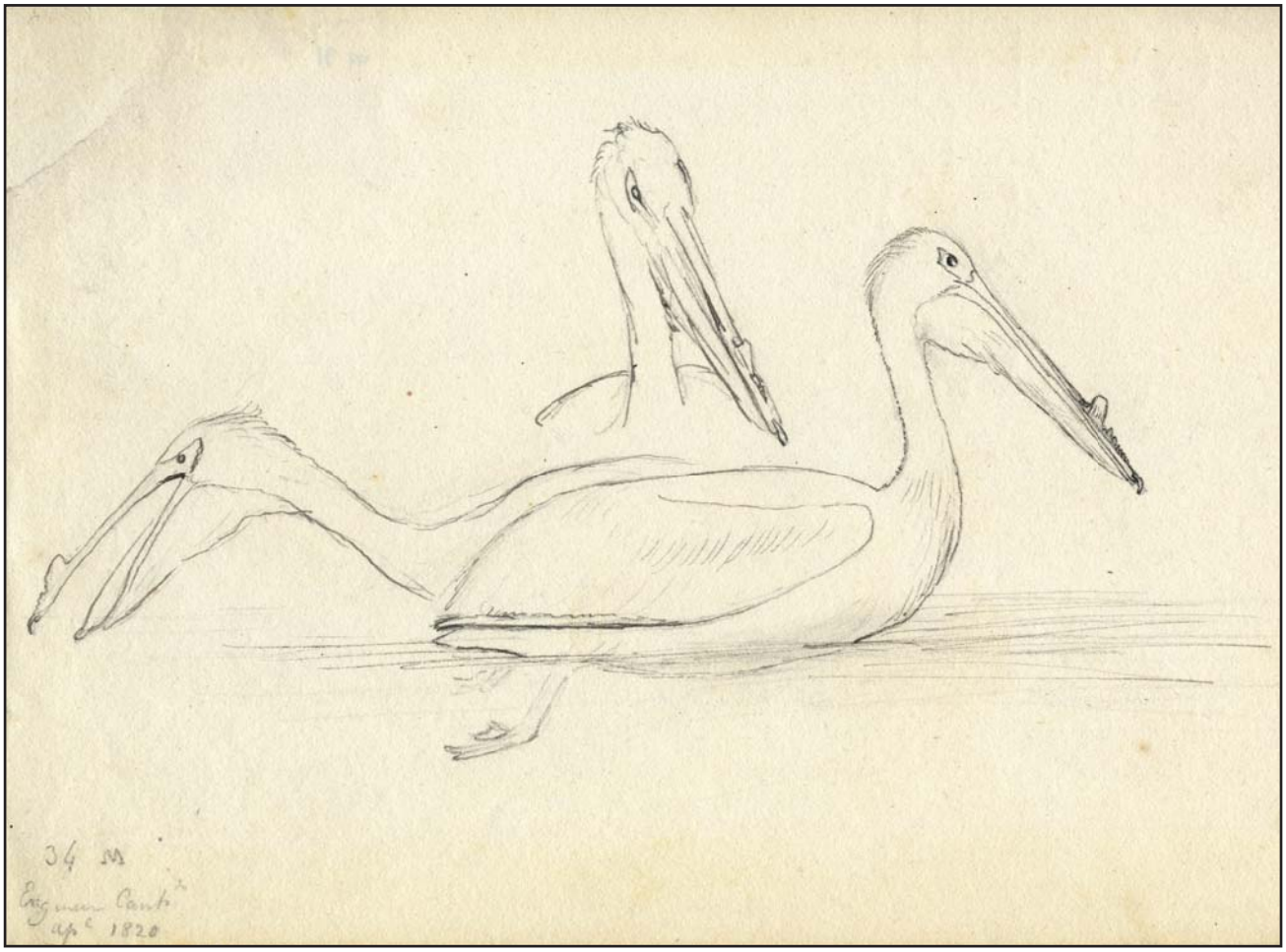


Fig. 11.2.3. American White Pelican. Courtesy of the American Philosophical Society, APSimg5670.

Fig. 11.2.4. Wood Duck. Courtesy of the American Philosophical Society, APSimg5668.

rivers, lakes, and reservoirs. Wood Ducks would be seen flying through the trees and found on the small sloughs and channels near camp and might have been a little easier shooting during the spring when they were attempting to set up territories and establish nests. Wood Ducks nest in tree cavities so that when the ducklings are ready to leave the nest, they are called by their mother and safely jump to the ground where they make their way to water. Unlike most other ducks, Wood Ducks have sharp claws for perching in trees. The note in the lower left corner of the painting states: "Engineer Cant, Apr 1820." A general note from the expedition journal states the following about the bird migration observed at Engineer Cantonment: "The great migration of geese, swans, ducks, and cranes, commenced on the 22nd of February, and terminated the latter end of March, 1820." Wood duck was the most common bird recovered from archeological excavations at Jean Cabanné's trading post, less than 5 km south of Engineer Cantonment (Bozell 1998:135).

Rough-legged Hawk

Fig. 11.2.5 of a hanging bird by Peale is of a Rough-legged Hawk (*Buteo lagopus*, called *Falco lagopus* by Thomas Say). There is a long tradition in English cuisine of hanging game birds for several days before preparation for cooking. It is not known whether or not this hawk served a dual purpose of scientific specimen and culinary item, but the Long Expedition was dependent on subsistence hunting during much of its travels. The plumage of the Rough-legged Hawk is variable, but all plumages have white tails with a wide dark band. A characteristic of this species is that the tarsi (lower legs) are feathered to the base of the toes, which is barely illustrated in this drawing, but the spotted feathers do seem to extend that far. The dark feathers forming a spot on the underside of the wrist is a definitive field mark easily identifying this as Rough-legged Hawk. This is a hawk that prefers open habitats, hunting by coursing over grasslands looking for small mammals and birds, and hovering when necessary with a deep flapping motion of their wings. It is a common migrant and winter visitor across the state of Nebraska. This illustration also includes a study of the eye of the hawk. The overall appearance of the hawk in the drawing is that of an immature bird, when the eye color is much paler than in the adult. In art, a study is a drawing, sketch, or painting done in preparation for a finished piece, or as visual notes. This may indicate that Peale was considering completing a life-like drawing of a Rough-legged Hawk at some future date.

Sandhill Crane

Fig. 11.2.6 is a watercolor that shows Greater Sandhill Cranes (*Grus canadensis tabida*) near the Bowyer (Boyer) River along the eastern side of the Missouri River

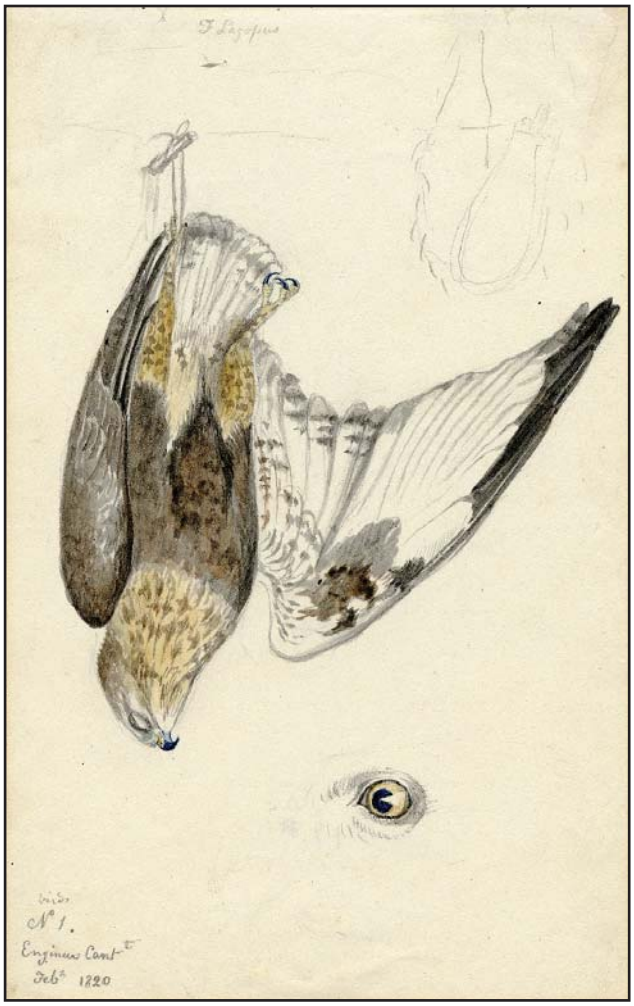


Fig. 11.2.5. Rough-legged Hawk. Courtesy of the American Philosophical Society, APSimg2028.

across from Engineer Cantonment on April 13, 1820. According to the expedition journal on this date:

> . . . we were awakened by the loud cries of the sandhill crane, performing evolutions in the air, high over their feeding grounds. . . . The sandhill crane, in the spring of the year, removes the surface of the soil by scratching with its feet, in search of the radical tubers of the pea vine [groundnut, *Apios americana*], which seem to afford them a very palatable food. . . . This crane is a social bird, sometimes assembling together in considerable flocks.

The sexes of the Sandhill Crane are similar in plumage being ash colored, with a red cap on the forehead. This is the Greater Sandhill Crane based upon the longer bill in proportion to the length of the head, which is easily determined based on Peale's drawing. This is the subspecies that would be expected to migrate along the Mississippi flyway, including the Missouri River as opposed to the Lesser Sandhill Cranes (*G. c. canadensis*), which are common spring migrants in the central flyway along the Platte River Valley in Nebraska, primarily between Grand Island to Overton and near Lewellen. The Greater Sandhill Cranes nest in areas around the Great Lakes and on the northern Great Plains, whereas the Lessers are Arctic nesters. The individual depicted in flight illustrates a typical heads-up posture of a crane coming in to alight.

Pectoral Sandpiper

One of Peale's sketches and partial watercolor (fig. 11.2.7), which may serve as a study of the species for a later painting, is of a male Pectoral Sandpiper (*Calidris melanotos*). Thomas Say described and named this bird in 1823 as new to science based on specimens from Engineer Cantonment as *Pelidna pectoralis*; however, this species of bird already had been described and named (*Tringa melanotos*) by the French naturalist Louis Jean Pierre Vieillot in 1819 based on specimens from Paraguay. Under the rules of science, the oldest name for a species has priority, thus Vieillot's name is to be used for this species, which has now been transferred based on available scientific information, to the genus *Calidris*, making the correct scientific name for the Pectoral Sandpiper to be *Calidris melanotos.* Pectoral Sandpipers are migrants in Nebraska. This species undertakes a long-distance migration, breeding in the tundra of northeastern Asia and North America and wintering in South America. Peale's drawing is not complete but an extensive description is given in the expedition journal. The plumage of the back, throat, and breast are mottled and striped brown. The streaked breast abruptly borders the white under parts. The legs are yellowish and the olive-green bill is darker at the tip. Pectoral Sandpiper males have inflatable sacs in their breasts used in courting females. Note in lower left corner is: "No. 37, Length 9 1/2 inches, male, Eng. Cant't May 5th 1820."

Scarlet Tanager

It is interesting that Peale chose this death pose for his adult male Scarlet Tanager (*Piranga olivacea*) (fig. 11.2.8). It tells us some interesting things about the collecting methods being used by members of the Long Expedition. They were almost certainly shooting to obtain small bird specimens using muskets with light loads or 'bird [or dust] shot' and fowling pieces (shotguns). Over 90 percent of the lead ammunition recovered from Engineer Cantonment was small diameter consistent with that used for killing small game and birds (see Steinauer this volume, Section 4.2). The paper in the drawing probably served a special purpose still used today when collecting birds. The

Fig. 11.2.6. Greater Sandhill Cranes. Courtesy of the American Philosophical Society, APSimg2035.

paper is rolled into a cone and after the bird has been taken, it is placed head first into the cone. This keeps the bird's feathers lying naturally and quickly stops any blood flow. This allows the work of preparing a scientific specimen or a taxidermy mount to proceed more quickly. As opposed to the red and black plumage of the males, the female has a uniformly olive head, back, and rump; whitish wing linings; and a yellow undertail. The Scarlet Tanager in Nebraska, then and today, is primarily restricted to oak forests along the Missouri River. The typical arrival date for Scarlet Tanager is late April or early May. These are insect-eating birds. The note in the lower left corner states: "Engineer Cantonment Mo, 1820." At the time of the Long Expedition, Engineer Cantonment and Nebraska were part of the Missouri Territory.

American Tree Sparrow

Fig. 11.2.9 is a sketch and beginning of a watercolor by Peale of an American Tree Sparrow (*Spizella arborea*). The completed characters that are immediately evident are those that undoubtedly identify the bird as an American Tree Sparrow. This might be an incomplete watercolor, a quick drawing, or a reference sketch, highlighting these important characters as a study for later reference. The rufous marks on the face and crown, central breast spot, and bicolored bill all fit perfectly for this common winter resident of the Great Plains. The bulk of the migrants of this Arctic nesting species arrive in Nebraska by late October and most have departed in late March. These sparrows are usually found in flocks among thickets, weedy grasslands, or groves of trees. Their diet in winter consists of grass seeds and weed seeds, such as goldenrod, aster, and crabgrass. The musical calls of the flocks of this species probably became very familiar to the Engineer Cantonment party in mid-winter. The note in the lower left corner states: "(No. 7 Say) No. 32 Engin'r Cant't, March 1820."

Fig. 11.2.7. Pectoral Sandpiper. Courtesy of the American Philosophical Society, APSimg5672.

Fig. 11.2.8. Scarlet Tanager. Courtesy of the American Philosophical Society, APSimg5396.

Fig. 11.2.9. American Tree Sparrow. Courtesy of the American Philosophical Society, APSimg5665.

Yellow-headed Blackbird

Fig. 11.2.10 is a watercolor in which, Peale records a male and female Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*). Written in a very small handwriting at about ground level under the male's tail is the note: "killed near the Ottoe village 14th May 1820." According to the expedition journal, the permanent village of the Oto nation was: "composed of large dirt lodges, similar to those of the Konzas and Omawhaws, and is situated on the left bank of the river Platte, or Nebraska, about forty miles above its confluence with the Missouri." This village has been recorded as archeological site 25SD1, or the 'Yutan' site, and has been partially excavated by the NSHS. The Oto earthlodges can be seen in the background of the painting, with the Platte River beyond. May 14 also was the first date that the expedition recorded the Yellow-headed Blackbird in the area. Peale has skillfully represented the distinctive plumage characteristic of both the male and female. Yellow-headed Blackbirds are common spring and fall migrants across the state of Nebraska. They are also common summer residents, nesting in marshy areas and other habitats with cattails and bulrushes, where they are often found nesting near Red-winged Blackbirds (*Agelaius phoeniceus*). The small beetle in the foreground is probably *Collops bipunctatus*, the soft-winged flower beetle. This member of the order Coleoptera was described by Thomas Say. The birds are roosting on a sedge of the genus *Carex* (sedges).

Shrews

Fig. 11.2.11, an illustration of two shrews with only limited background, is one of Peale's most scientifically valuable works from the Long Expedition. The upper shrew is the holotype of the northern short-tailed shrew (*Blarina brevicauda*), and the lower is the holotype of the North American least shrew (*Cryptotis parva*). These two shrews were described as new to science by Thomas Say, scientist on the Long Expedition, based on these two specimens from Engineer Cantonment. The northern short-tailed shrew commonly occurs throughout the northern half of the eastern United States and southern Canada, and the least shrew occurs throughout the eastern United States and southward into Mexico. These shrews are common in the woods, fields, and gardens in and around Philadelphia

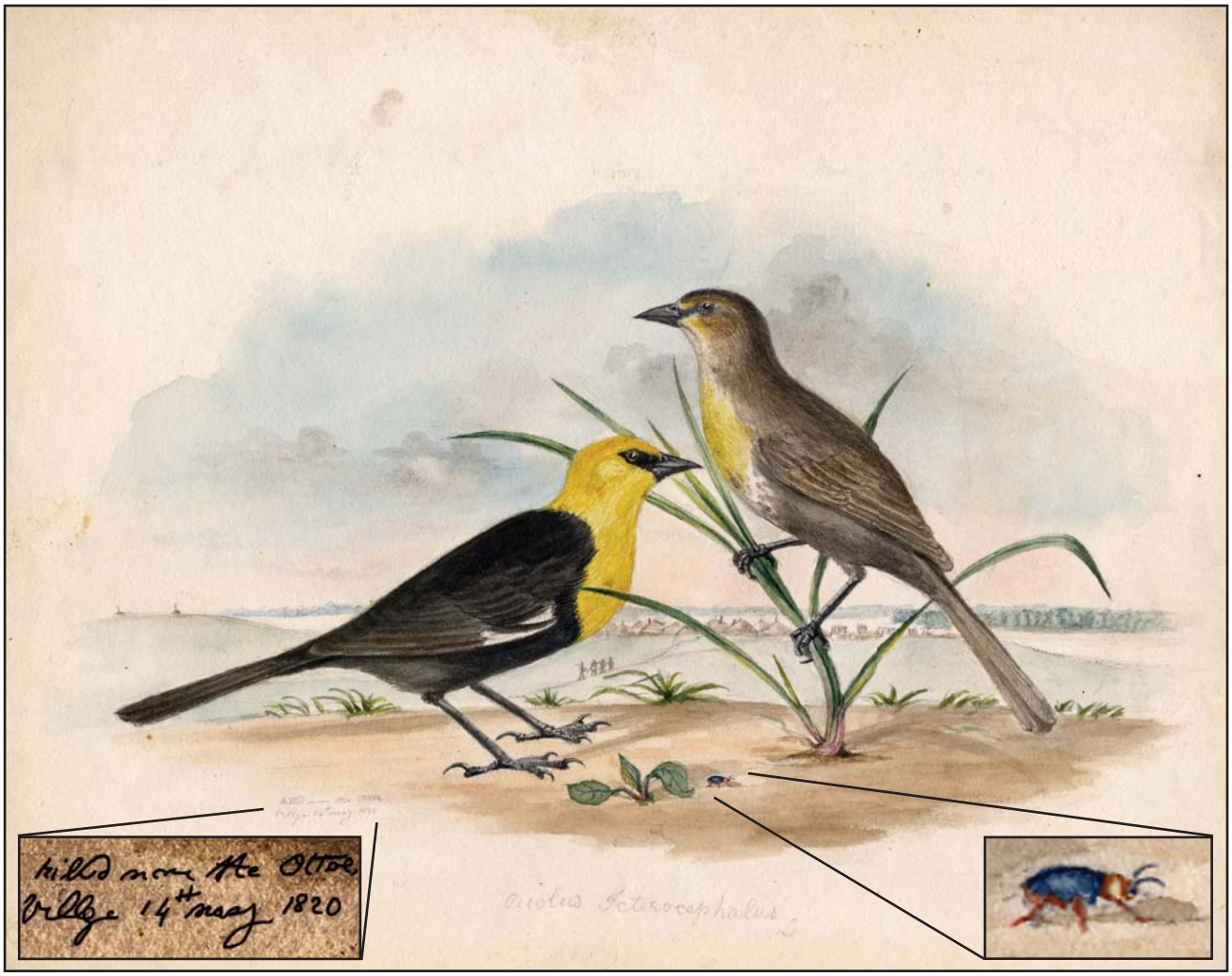


Fig. 11.2.10. Yellow-headed Blackbird. Courtesy of the American Philosophical Society, APSimg5673.

where both Peale and Say lived, but yet these species were discovered near the western edge of their distribution. Part of the explanation for this anomalous situation is that shrews are difficult to obtain and that there were no functional traps for rats, mice, or shrews in 1820. Say's description of the holotype of *Cryptotis* states: "Mr. Peale caught this animal in a pitfall, which he had dug for the purpose of catching a wolf." Today shrews are often trapped using pitfalls, but they are much smaller than it would take to catch a wolf. Part of the value of this watercolor by Peale is that the actual specimens on which it is based and on which scientific names are based have been lost. This is the only remaining evidence documenting the origins of these two names. Although the background of the picture is quite sketchy, it does seem to represent a bluff, river, and island with trees. Comparing this background to Peale's drawing of Engineer Cantonment, it appears that this setting is probably near the cabins.

Eastern Red Bat

Depicted in fig. 11.2.12 are two views of the eastern red bat (*Lasiurus borealis*). This species occurs in an area that covers a little over the eastern half of the United States and southern Canada. Eastern red bats are common inhabitants of Nebraska and roost in trees. They have actually expanded their geographic range westwards as forests developed along streams and rivers and in cities. This species of bat is relatively small with a wingspan of about 33 cm (13 inches). At the top of the illustration is an eastern red bat 'roosting' on a tree branch. This is an incorrect depiction and gives a good indication of the poor state of knowledge of bats and other mammals in 1820. Bats do not hang from a roost by their thumbs as shown, but rather by their hind feet. Bats are able to hang 'upside down' for long periods because of an elegant counter-locking mechanism in their feet allows them to assume this position without expending energy. The prey of eastern red bats is insects as shown, but their method of catching insects usually differs from that depicted by Peale. Insects

Fig. 11.2.11. Northern short-tailed shrew and least shrew. Courtesy of the American Philosophical Society, APSimg5387.

are not directly caught in their mouths, but are taken by use of the membrane between their hind legs and tail curled into a kind of catcher's mitt to first intercept the insect and then the bat reaches its head in and seizes the insect in its teeth. This is even more remarkable because it is all accomplished while on the wing.

Bobcat

Fig. 11.2.13 is Peale's watercolor of a bobcat (*Lynx rufus*) in repose. In the foreground are two feathers and a skull, undoubtedly of a goose. These are appropriate props because bobcats are carnivores that take birds and mammals up to the size of white-tailed deer as prey items. The background is likely the Missouri River and the loess hills that mark the eastern boundary of the floodplain. Bobcats remain the most abundant of the North American cats, occurring throughout the United States, southern Canada, and northern Mexico. Peale's representation of the bobcat is highly accurate. The pelage is grayish brown becoming whitish on the belly. There are dark streaks on the body that often break into spots and dark bars on the legs and the short tail. As Peale has shown, on some individuals the body spots may become indistinct. The face of the bobcat may appear disproportionally wide, but this is because there is a fringe of hair along both sides of the face below the ears. The expedition journal records the following upon the departure of a group from the Omaha Tribe on April 7, 1820: "Before they went, they presented to us a wild cat, which they had shot, but we advised them to keep it to eat on the way home, upon which they thanked us for it . . ." The note at the lower right corner is "Engineer Cant't Missouri, 1819, TRP."

Red Fox

Peale's depiction of the red fox (*Vulpes vulpes*) (fig. 11.2.14) is probably his least successful execution of a mammal from Engineer Cantonment. It is interesting that color and color patterns are perfect, but the pose with stiff legs lacks the nimble, inquisitive nature of the fox. Peale had undoubtedly seen a body of a red fox, but probably had limited or no opportunity to observe them in life. The red fox is the most widely distributed carnivore in the world occurring essentially throughout the northern hemisphere and thus Nebraska as well. Any mammal occurring over such a large area will have variation in their coat color and patterns, but the reddish or rusty brown overall color is appropriate for Nebraska. The tip of the tail is white and the chin, throat, and upper chest are white to whitish

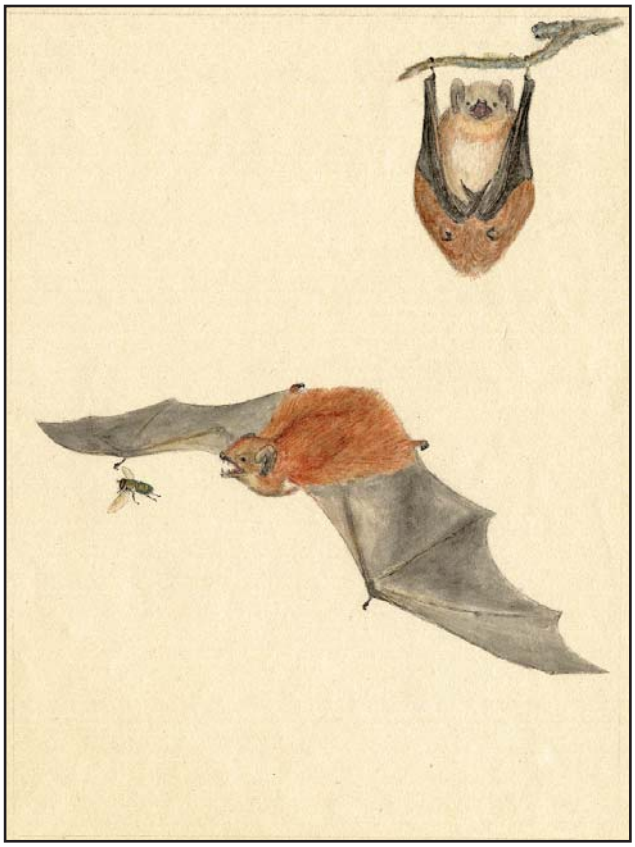


Fig. 11.2.12. Eastern red bat. Courtesy of the American Philosophical Society, APSimg5503.

gray. Black appears on the nose, back of ears, and on the legs. This nocturnal carnivore generally takes rodents, rabbits, and other small vertebrates. Red foxes also eat fruits, berries, and insects. The red fox prefers wooded habitats to open grasslands, but it also uses cropland and urban environments. Peale has given this image a very nondescript background, but appears to be in an area of rolling hills with very few trees, probably typical of the prairies west of Engineer Cantonment.

Coyote

Because the coyote (fig. 11.2.15 A-C) is a common and conspicuous inhabitant of the United States as far eastward as the Great Lakes to Louisiana, it certainly must have been observed by earlier explorers and travelers through these regions and along the Missouri River. Nevertheless, Thomas Say was the first scientist to describe and give a scientific name to the coyote (*Canis latrans*) based on specimens from the vicinity of Engineer Cantonment. This remains the name and type locality for the coyote today. As with the dusky wolf, the holotype specimen has been lost for the coyote, leaving Peale's beautiful rendition of the coyote our best record of the specimen. It does appear that the description is based on as many as four individuals, but none is available. Say described the color of his coyote as: "Cinereous or gray, varied with black above, and dull fulvous [dull brownish

Fig. 11.2.13. Bobcat. Courtesy of the American Philosophical Society, APSimg5711.

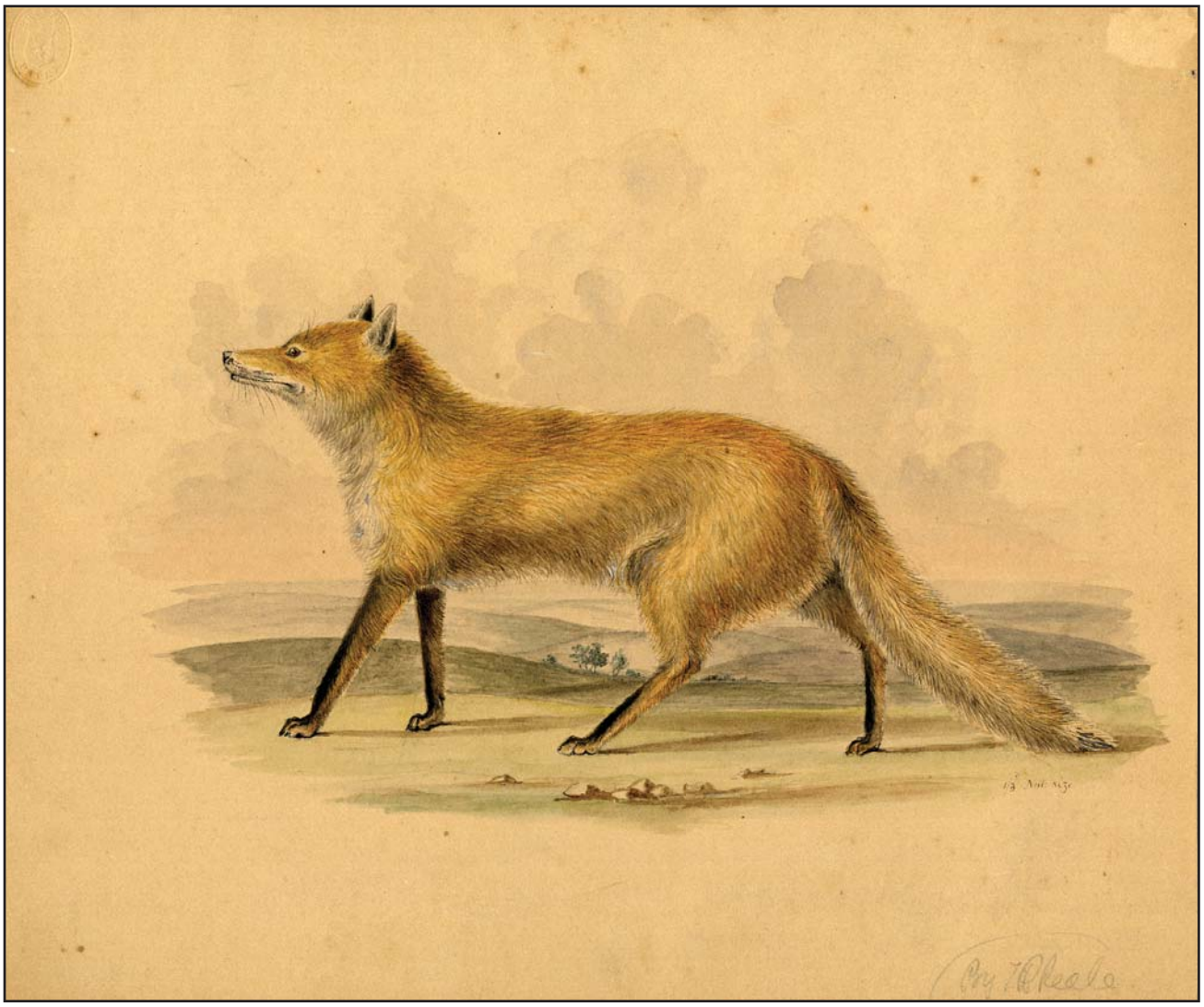


Fig. 11.2.14. Red fox. Courtesy of the American Philosophical Society, APSimg5721.

yellow, tawny], or cinnamon [dark reddish brown] . . . .” “. . . beneath white . . . .” Say found the coyote, or in his words “prairie wolf,” to be common: “The prairie wolves roam over the plains in considerable numbers . . . . They are by far the most numerous of our wolves and often unite in packs . . . .” In the expedition journal for January 6, 1820, it was noted: “We hear the barking of the prairie wolves every night about us; they venture close to our huts; last night they ran down and killed a doe, within a short distance of our huts; this morning the remains of the carcase were found, consisting only of bones and skin.”

The expedition journal describes in some detail the struggles of Peale and Say trying to trap one of these animals and would seem to have been prepared to coin the term ‘clever coyote.’ Peale’s pencil drawing indicates (fig. 11.2.15 A) they ultimately were successful in capturing an individual in a leg-hold trap, leading Say to comment: “Taken in a trap, baited with the body of a wild cat.” Coyotes feed primarily on small and medium-sized mammals—cottontail rabbits (*Sylvilagus* sp.), jackrabbits (*Lepus* sp.), rats, mice, and even white-tailed deer (*O. virginianus*) as indicated by Peale’s and Say’s notes.

Wolf

Fig. 11.2.16 A is another of Peale’s extremely valuable watercolors, both historically and scientifically. This illustration is of the holotype of Thomas Say’s dusky wolf (*Canis nubilus*), which is now accepted as a subspecies (a geographically recognizable population) of the gray wolf (*Canis lupus*). This is the Great Plains wolf or the buffalo wolf of western lore, known for hunting and killing bison. Surprisingly, the taxonomy of wolves is currently in a state of flux, but all definitions of populations still include *C. l. nubilus.* Some authors give the dusky wolf a geographic range far beyond the Great Plains, while others only recognize their presence on the Great Plains. In the latter scenario, this wolf is considered to be

Fig. 11.2.15 A. Coyote. Courtesy of the American Philosophical Society, APSimg2051.

Fig. 11.2.15 B. Coyote. Courtesy of the American Philosophical Society, APSimg5640.

Fig. 11.2.15 C. Coyote. Courtesy of the American Philosophical Society, APSimg5715.

Fig. 11.2.16 A. Dusky Wolf. Courtesy of the American Philosophical Society APSimg5397.

Fig. 11.2.16 B. Buffalo and Wolf. Courtesy of the American Philosophical Society APSimg5649.

extinct, whereas in the former, some living populations are considered to exist. No matter what taxonomy is applied, however, it is certain that the hunters of the great bison herds of the central grasslands of the United States are gone forever. Peale has left us the first image of this magnificent animal and it certainly ranks as one of the best illustrations yet available. Because the holotype specimen has been lost, this is our one true documentation of this wolf.

The description by Say of this new wolf states: "Dusky, the hair cinereous [ash-gray] at base, then brownish-black then gray, then black; the proportion of black upon the hairs, is so considerable, as to give to the whole animal a much darker colour, than the darkest of the [*C.*] *latrans* . . . ." "beneath dusky ferruginous [reddish brown], greyish with long hair between the hind thighs, and with a large white spot on the breast . . . ." Say noted: "It diffuses a strong and disagreeable odour, which scented the clothing of Messrs. Peale and Dougherty, who transported the animal several miles from where they killed it, to the cantonment." Say believed that "The aspect of this animal, is far more fierce and formidable . . . ." than the common coyote near their camp.

Peale depicts the wolf feeding on the remains of a male white-tailed deer (*O. virginianus*) and it is joined by three Black-billed Magpies (*Pica hudsonia*). A river with a grove of trees can be seen in the distance (fig. 11.2.16 A). The second image (fig. 11.2.16 B) is a pencil sketch by Peale showing two wolves attacking a bison *(B. bison*).

Long-tailed Weasel

This watercolor by Peale is of long-tailed weasels (*Mustela frenata*) demonstrating summer and winter pelage colors (fig. 11.2.17). Long-tailed weasels are relatively common inhabitants of Nebraska that occur throughout most of the United States and southwestern Canada and southward into Mexico and South America. The background animal is a long-tailed weasel in summer pelage. The coat is bicolored, with reddish brown on the back and Peale's representation of a very light buff color on the belly is perfect for this species. The relatively long tail with the black tip matches the characters of this species. The white animal in the foreground is a long-tailed weasel in winter pelage. Peale would not have encountered a winter phase weasel in 1819–1820 except at Engineer Cantonment. Nebraska is an area where both white and red-brown winter pelage can be found in long-tailed weasels, but to the north the winter animals are in white and to the south the pelage is generally reddish brown and buff. The tail of the animal in the foreground is long and the black hair on the tip covers more than the very end of the tail. The one weasel holds what appears to be a fledgling, or near-fledgling, meadowlark (*Sturnella* sp.) in its mouth, although small mice and rats are much more common prey for weasels. The long slender body of the weasel is designed for pursuing these prey animals into their burrows and nests.

Fig. 11.2.17. Long-tailed weasel. Courtesy of the American Philosophical Society, APSimg5730.

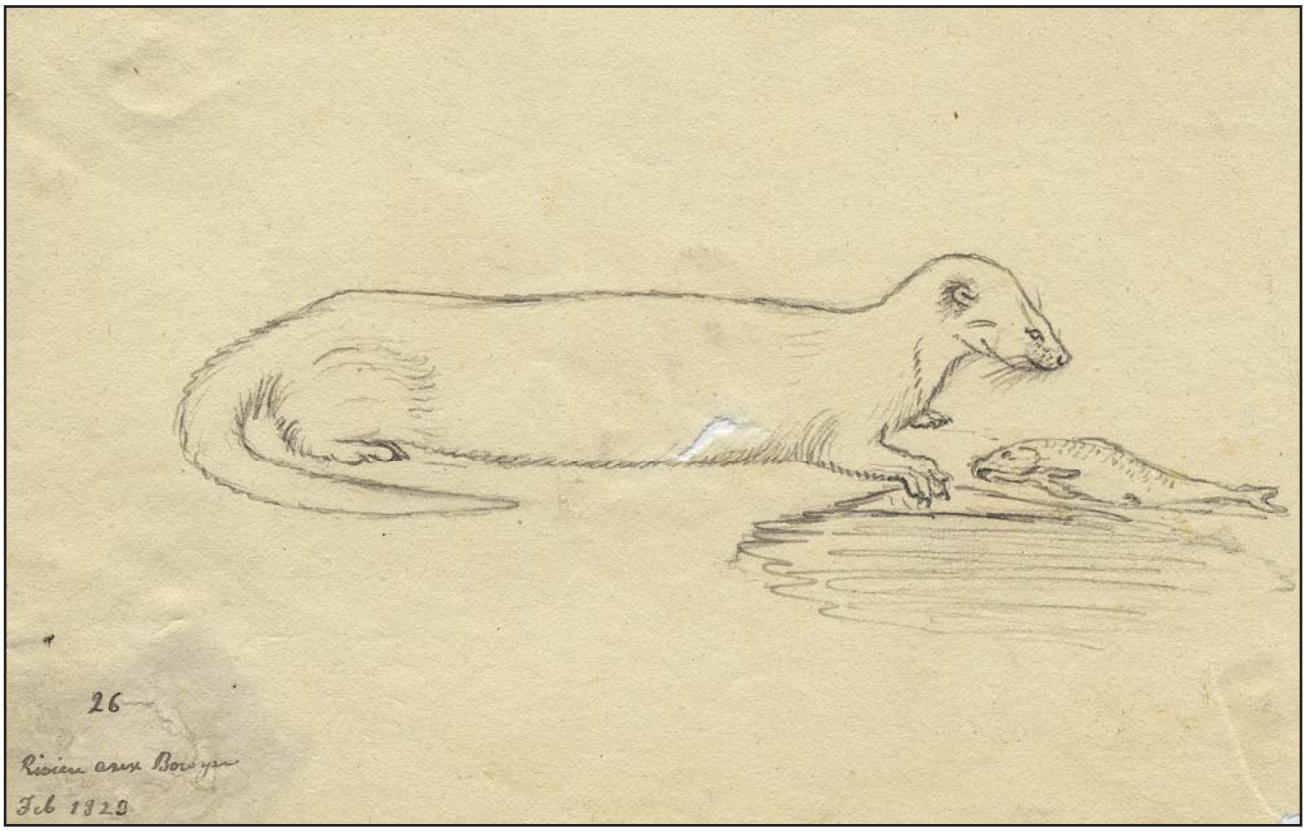


Fig. 11.2.18. North American river otter. Courtesy of the American Philosophical Society, APSimg5395.

River Otter

Peale's pencil drawing depicts a North American river otter (*Lontra canadensis*) at an ice hole with a fish as a prey item (fig. 11.2.18). The notation in the lower left corner is "Rivière aux Bowyer [Boyer River], Feb 1820." The expedition journal described the encounter with otters:

> Otters are frequent on the Missouri. We had the opportunity of seeing on the ice of Boyer creek, a considerable number of the tracks or paths of Otter . . . . appeared as if the animal was accustomed to slide in his movements on the ice, as there were, in the first place, the impression of two feet, then a long mark clear of snow a distance of three or four feet, then the impressions of the feet of the animal, after which the sliding mark, and so on alternatively. These paths were numerous, and passed between the bank and a situation, where a hole had been in the ice, now frozen over.

Otters are large members of the weasel family with elongated bodies and a thick tail, sometimes reaching over 1.2 m (4 ft) long in total length, and with short legs terminating in webbed feet highly adapted to swimming. Otters were present in Nebraska wherever aquatic habitats were available, supplying their diet of fish, clams, snails, and other small aquatic and terrestrial animals. However, by 1920, the species had been extirpated from the state because of trapping and habitat loss. Beginning in 1986, a successful reintroduction program has returned river otters to Nebraska's rivers, streams, and lakes. The fish in the illustration is not described, but the form depicted—with a suggestion of lips, scale-less head, semi-circular opercular membrane, pectoral fins, and placement of the pelvic fins—may be a member of the sucker family, perhaps a white sucker. Jones et al. (1983:308) note the importance of "… rough fish, such as suckers…" in otter diet (see Falk et al. this volume, Section 9.4).

American Badger

Fig. 11.2.19 is a watercolor that presents two American badgers (*Taxidea taxus*). This species occurred throughout the western two-thirds of the United States and adjacent parts of southern Canada and northern Mexico. The species was particularly abundant in the grasslands of the Great Plains. This panoramic view is open prairie with a few wooded ravines in the distance. The badger nearest the viewer appears relatively small and may be a

Fig. 11.2.19. American badger. Courtesy of the American Philosophical Society, APSimg2026.

depiction of a juvenile animal, whereas the other individual is a fully-grown adult of unknown sex. Peale demonstrates his unfamiliarity with these animals because his depictions of the heads of both badgers are very dog-like, with a strong drop between the top of the head and the nose just in front of the eyes. Badgers are close relatives of weasels so the top of the head is essentially level. Peale gives a good representation of the heavy claws of the these badgers, which are used for digging nest burrows as shown or pursuing their chief prey items such as pocket gophers (*Geomys* sp.), black-tailed prairie dogs (*Cynomys ludovicianus*), and other ground squirrels (one of at least four genera occurring in the state).

White-tailed Deer

Fig.11.2.20 is a sketch and partial watercolor by Peale is of a fawn of the white-tailed deer (*Odocoileus virginianus*). One of the challenges of identifying the subject of this drawing is distinguishing the fawn of the white-tailed deer and that of the other common deer species in Nebraska, mule deer (*Odocoileus hemionus*). Mule deer fawns have a black tip on the tail like the adults, which is not present in this sketch. Mule deer fawns have black on the ears, especially along the leading edge, which again is not present in Peale's drawing. White-tailed fawns have a white chin and upper throat not present in mule deer. Another question might be: how is this discernible as a fawn in the absence of spots, in the watercolor, the portion of the fawn where white spots should appear is incomplete. However, Peale appears to have started to outline in watercolor two spots on the flank near the base of the tail. There also appears to be another spot in progress low on the front shoulder. High on the front shoulder at least four spots can be seen faintly sketched in pencil. Furthermore, Peale has given us an individual that appears very immature and therefore is likely a fawn. The expedition journal comments on 19 February 1820: "We have been hitherto very well supplied with fresh meat, from game killed principally by Mr. Peale, who, on one occasion, killed two deer at a single shot and with one ball . . ."

Pronghorn

In fig. 11.2.21 Peale presents a 'family portrait' for the pronghorn (*Antilocapra americana*) showing an adult male and female with a pair of fawns, which is the commonest birth grouping. This must be one of the earliest portrayals of the pronghorn and certainly of a family group. The Lewis and Clark Expedition made the

Fig. 11.2.20. White-tailed deer. Courtesy of the American Philosophical Society, APSimg5644.

pronghorn known to American science when they shot an individual in what is today southeastern South Dakota. It was not until 1815 that George Ord described the species as new to science. Ord had worked in association with the Philadelphia Academy of Natural Sciences, along with Say and Peale, so they were undoubtedly familiar with the pronghorn and would recognize them. On April 23, 1820, west of Engineer Cantonment, the expedition journal noted: "In the vicinity several antelopes were seen by the party, but they were so shy and swift, that it was not possible to kill one of them." Many times pronghorns are called "antelopes," but this is not correct because they are the sole survivors of a New World hoofed family, the Antilocapridae, whereas true antelopes are members of the Old World family of hoofed mammals, Bovidae, which includes cattle, sheep, and goats. These two families differ in the shape and growth of their horns. The horn of the pronghorn is composed of a permanent core of laterally

Fig. 11.2.21. Pronghorn. Courtesy of the American Philosophical Society, APSimg2039.

flattened bone blade that grows from the frontal bones of the skull (in bovid this horn core is oval in shape). The horn cores in the pronghorn are covered in skin that develops into a keratinous sheath, which is shed and regrown on an annual basis in both males and females, whereas in bovids the horn sheath is never shed. The horn sheaths of the pronghorn are branched, each sheath possessing a forward-pointing tine (hence the name pronghorn), but the horn sheath of bovids is never branched. Although pronghorns were first seen near Engineer Cantonment, the setting for this drawing appears to be further west in Nebraska, eastern Colorado, or even the front range of the Rockies. The cacti at the feet of the pronghorns are prickly pears, of the genus *Opuntia*, with fruits, and the blue flowers are beard-tongue of the genus *Penstemon*.

Bison

The American bison (*Bison bison*) is one of the iconic animals of the American west where it formed great herds on the grasslands of the Great Plains. Bison and the prairie dog are considered to be keystone species for the prairie because they modify the local environment, providing sites for other animals to inhabit. The largest herds of bison were probably present in the short-grass and mid-grass prairies farther west in Nebraska, but there were certainly herds in the tall grass prairie in eastern Nebraska within reach of Engineer Cantonment. The notation on the watercolor of the four bison (fig. 11.2.22 A) is "Bulls, Feb 1820." The journal of the trip states: "22nd [Feb]. Messrs. Dougherty and Peale returned from a hunt, having killed twelve bisons, out of a herd of several hundreds they met with near Sioux river, and brought us a seasonable supply of meat." Both of Peale's bison images undoubtedly are based on this experience. The watercolor with four bull bison is interesting in that bison do not seem to display the heavy long wooly fur over the shoulders, neck, and head typical of the adult males of the species. In males this hair also forms a distinct beard on the chin, which does not seem to be particularly prominent on these individuals.

A

B

Fig. 11.2.22 A-B. American bison. Courtesy of the American Philosophical Society, APSimg2031, 4888.

Fig. 11.2.23. Eastern chipmunk. Courtesy of the American Philosophical Society, APSimg5729.

Based on their appearance these bulls may be young adults that have not gained fully mature characteristics. The impressionistic ink and watercolor depiction of hunting bison (fig. 11.2.22 B) is certainly a departure from Peale's usual scientifically accurate renderings.

Eastern Chipmunk

The beautiful little mammal depicted in fig. 11.2.23 is the eastern chipmunk (*Tamias striatus*), which is a member of the squirrel family. The species occurs in the forests and woodlots of the eastern United States and southern Canada. Nebraska lies at the very western edge of the geographic range of the species and the record from Engineer Cantonment is the northern-most along the Missouri River. This species is still a member of the Nebraska fauna, inhabiting the bluffs and woodlands bordering the Missouri River and its larger tributaries, but no populations are known north of Omaha. Eastern chipmunks have, as perfectly depicted by Peale, rufous-brown pelage with five dark brown to black stripes separating four pale brown to white stripes on the back. Eastern chipmunks experience periods of light hibernation during the winter months, but will arouse from torpor if periods of favorable weather occur. They eat bulbs, acorns, seeds, fruits, nuts, green plants, and mushrooms and are taken as prey by hawks, owls, weasels, and foxes. Eastern chipmunks have cheek pouches inside their mouths, which they can use to gather food and carry it to their burrows where the food can be eaten in safety or stored for future use. The oak leaves are appropriate in the foreground because these are animals of oak-hickory forests and forest-edges.

Muskrat

The muskrats (*Ondatra zibethicus*) shown in fig. 11.2.24 are common inhabitants of wetlands, marshes, lakes,

Fig. 11.2.24. Muskrat. Courtesy of the American Philosophical Society, APSimg5722.

streams, and rivers of Nebraska and are distributed widely throughout all of the United States, except the southernmost states, Canada, and Alaska. Peale has depicted this pair of muskrats in a riverine situation, probably the Missouri River or one of its tributaries, oxbows, or slough. This large rodent, about the size of a house cat, is second in size among Nebraska rodents only to the beaver. The muskrat is a semi-aquatic mammal with special modifications for this lifestyle, including webbed hind feet, tail flattened laterally (well illustrated by Peale in the individual pictured standing on land), and a thick, waterproof undercoat. Muskrats make nests in tunnels along banks or in lodges that are covered with reeds, cattails, and other vegetation in lakes and marshes. The nest chambers are always dry, but the entrance to the chamber is underwater to provide protection from predators. Muskrats are vegetarians eating the tubers and young shoots of cattails, bulrushes, and other aquatic vegetation. A partially gnawed tuber lies near the feet of the muskrat on the bank. A wide range of predators use muskrats as food, including mink (*Neovison vison*), coyotes (*Canis latrans*), hawks, and owls.

Meadow Jumping Mouse

This beautiful little rodent is the meadow jumping mouse, *Zapus hudsonius* (fig. 11.2.25). It is easily recognized by its coloration including the dark brown back, yellowish buff sides, and white belly. The hind feet are proportionally large and are used to make kangaroo-like hops that measure up to 90 cm. The tail is longer than the head and body, which is one characteristic that is not well illustrated by Peale; however, the tail may have been broken because Peale has tried to hide the tip in the grass. It is found throughout much of Nebraska where it occurs commonly in wetland situations around lakes and rivers and in wet meadows. Beyond Nebraska, it occurs throughout the northern half of the eastern United States, all of southern Canada, and into southern Alaska. This is a species that hibernates, going into torpor in early October and remaining until late April or May. Foods preferred by this jumping mouse include seeds, berries, fungus, and insects.

Fig. 11.2.25. Meadow jumping mouse. Courtesy of the American Philosophical Society, APSimg5506.

Endnotes

1 The first spelling rule of the American Ornithological Society, which is responsible for the official *Checklist of North and Middle American Birds*, and the International Ornithological Congress, which is responsible for the *World Bird List*, is "1. Official English names of birds capitalized, as is the current practice in ornithology." We have followed this convention in our contribution.

Bozell, Carlson, and Pepperl

ENGINEER CANTONMENT

2018

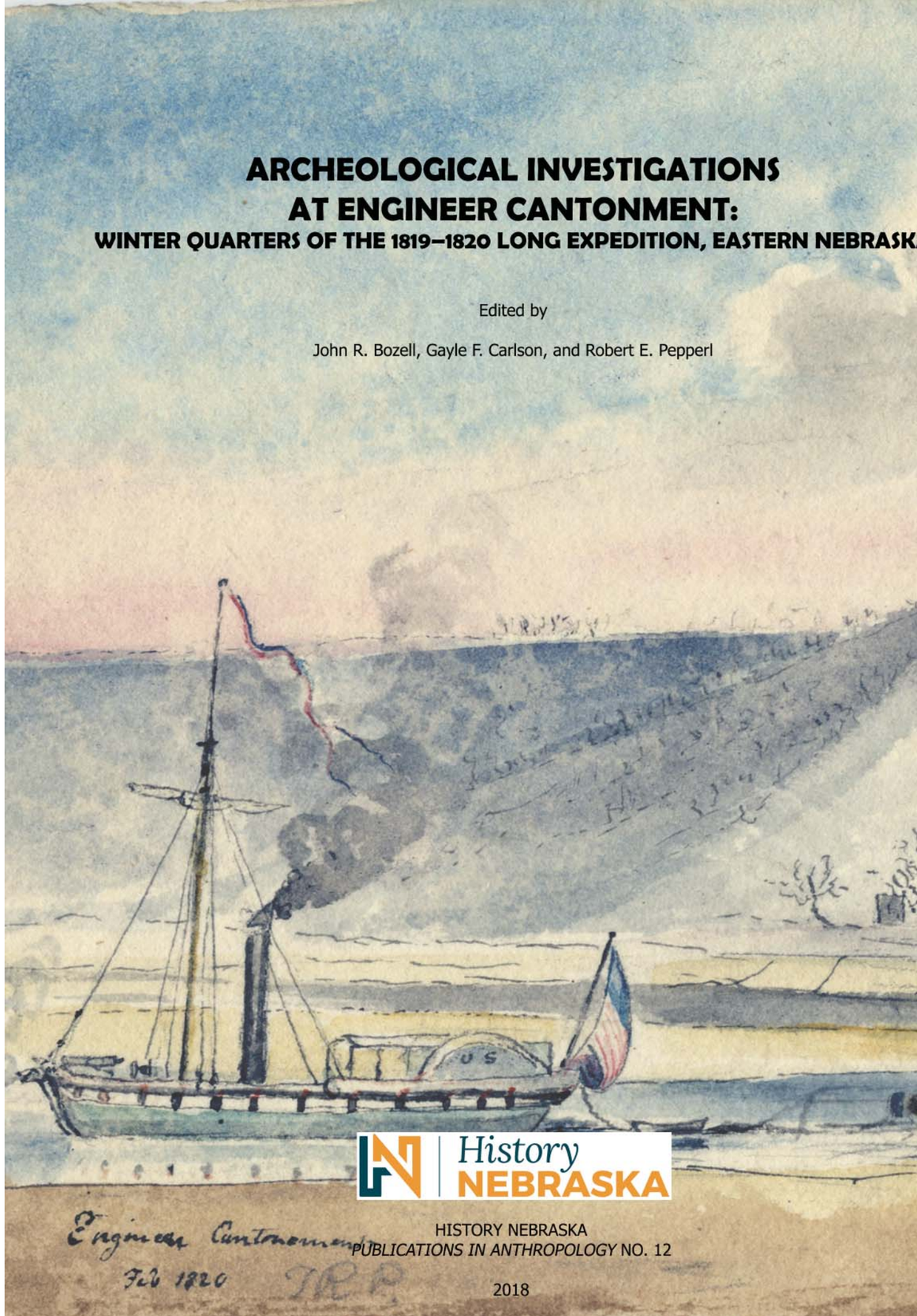
History NEBRASKA

ARCHEOLOGICAL INVESTIGATIONS AT ENGINEER CANTONMENT:

WINTER QUARTERS OF THE 1819–1820 LONG EXPEDITION, EASTERN NEBRASK

Edited by

John R. Bozell, Gayle F. Carlson, and Robert E. Pepperl



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